

SIMULIIDAE OF GOIÁS STATE AND THE FEDERAL
DISTRICT (BRASÍLIA)
1. A DESCRIPTION OF *SIMULIUM (CHIROSTILBIA)*
DEKEYSERI, NEW SPECIES

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A new Brazilian simuliid species, Simulium (Chirostilbia) dekeyseri, is described from reared adults as well as larvae and pupae. This zoophilic species has only been recorded from localities in the Cerrado region of the Central Brazilian Plateau.

The incrimination of Simuliidae as vectors of onchocerciasis (Rassi et al., 1975; Shelley et al., 1979) and as probable vectors of mansonelliasis (Cerqueira, 1959; Shelley & Shelley, 1976) in Brazil has revived interest in the taxonomic study of this family. Previous contributions had been made principally by Lutz & Pinto, later followed by the more detailed studies of the Andrettas, mainly on species from south-east Brazil.

The difficulties at present encountered in determining Brazilian Simuliidae are due not only to the lack of keys but also to the incomplete descriptions and poorly preserved material of the species named by Lutz and Pinto. An attempt is being made to remedy this situation by building up a reference collection of Simuliidae in the Oswaldo Cruz Institute, which will incorporate what remains of the Lutz and Pinto collections with new material collected in Goiás State, south-east Brazil and the Amazon region. Redescriptions, where necessary, of species named Lutz and Pinto as well as descriptions of new species in the collection, will be made with the eventual objective of providing a key to Brazilian species.

Simulium (Chirostilbia) dekeyseri, new species

Female. General body colour black. Length: body 1.7 – 3.5mm (dried specimens 1.7 – 2.4mm, alcohol specimens 2.4 – 3.5mm); wing 2.2 – 2.9mm.

Eyes black. Clypeus, frons and occiput pollinose with scattered adpressed yellow hairs, denser on eye margin and occiput. Some longer yellow hairs on posterior margin of

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eye. Pedicel and basal half of scape of antenna orange, distal half brown; basal flagellomeres orange-brown, rest brown-black. Mouthparts light brown, maxillary palps dark brown.

Frons broad, about one and a half to two times wider at vertex than at narrowest point (Fig. 1). Fronto-ocular triangle about one and a half times as long as broad (Fig. 2). Clypeus slightly longer than broad. Antenna with 11 segments, shape and proportions as shown in Fig. 3. Cibarium (Fig. 4) with well sclerotised lateral arms, median margin weakly sclerotised and unarmed. Apical segment of maxillary palp slightly longer than the combined lengths of the two preceding segments (Fig. 5); sensory vesicle (Fig. 6) elongate with its diameter equal to half the width of the third segment of the maxillary palp, neck short. Maxillae and mandibles with serrations on both edges; maxillae with 22 – 27 teeth, mandibles with 4 – 9 teeth on outer margin and 25 – 30 teeth on inner margin.

Mesonotum black with areas of pruinosity. With light source anterior to specimen mesonotum black with fine white pollinosity; 1 + 1 median silver pruinose vittae beginning at anterior margin, widening posteriorly and ending shortly before posterior margin of mesonotum and 1 + 1 wider, shorter vittae of same colour lateral to these, almost reaching lateral margin of mesonotum (Fig. 7). With light source posterior or lateral to specimen, pruinose and black areas of mesonotum become reversed and pattern not so distinct. Humeri and pronotum brownish, pruinose. Pronotum and mesonotum with yellowish hairs, denser on margins. Scutellum dark brown with long adpressed yellow hairs, denser anteriorly and pointing towards midline. Postnotum black, glabrous and pruinose. Pleura and sterna brown. Mesepimeral tuft of yellow hairs.

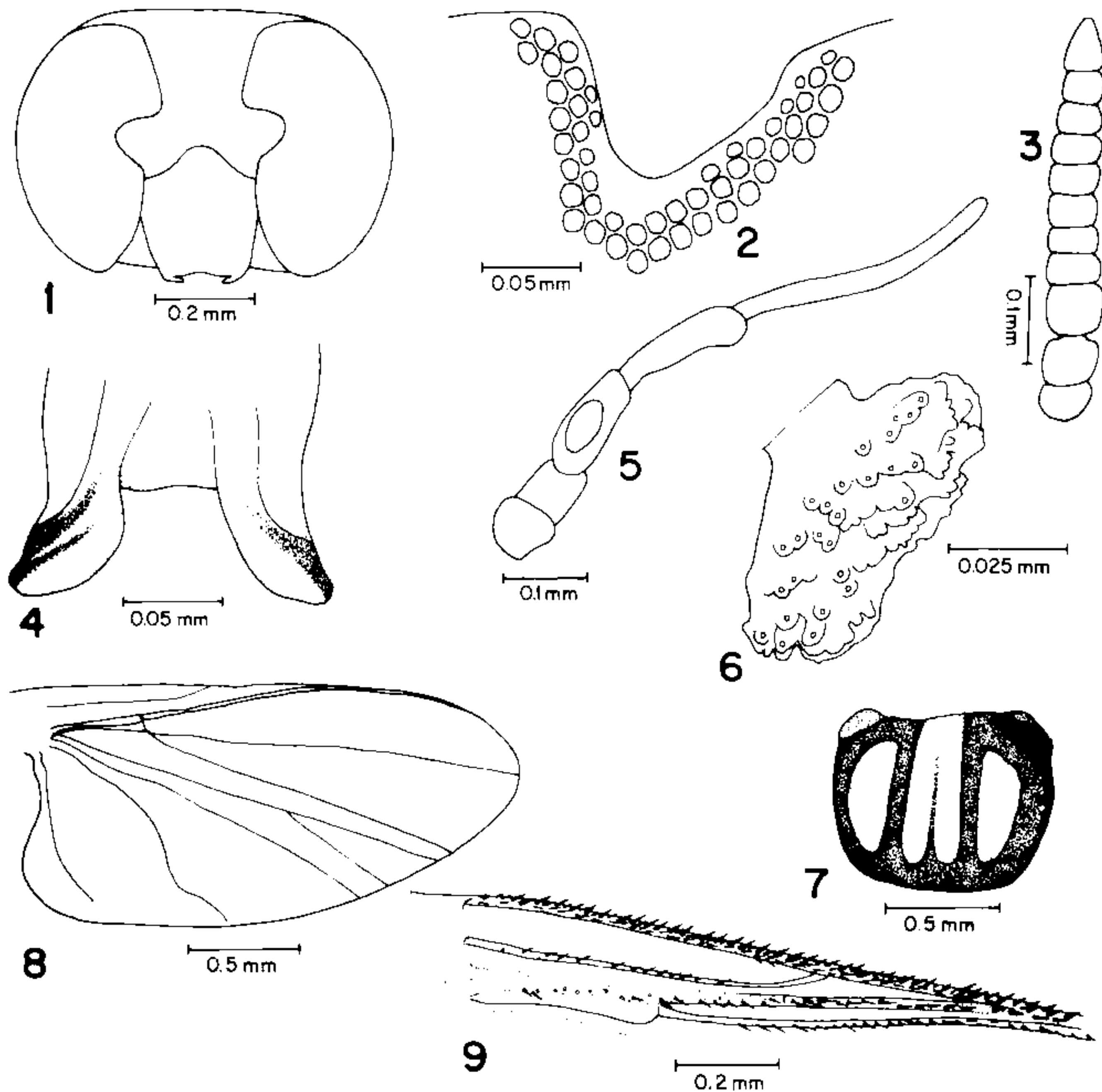
Wing veins brown. Wing venation as in Figs. 8 and 9. C with spiniform and hair-like macrotrichia; So with single row of hairlike macrotrichia on basal three fourths; basal section of R with hairlike macrotrichia mainly in a single row, but in places in a double row; R with single row of hairlike and spiniform macrotrichia; Rs simple with row of hairlike macrotrichia which terminate shortly before base.

Coxa, trochanter, femur and tibia of fore leg yellowish brown, distal tip of tibia brown; tarsus black. Mid leg coxa dark brown on basal half and yellowish brown on distal half; trochanter, femur, tibia and first three fourths of basitarsus yellowish, distal fourth dark brown; basal half of second tarsal segment yellowish brown, distal half black; rest of tarsus black except ventral surfaces of third and fourth segments which are light brown. Coxa of hind leg light brown, pruinose, trochanter and femur yellowish; basal half of tibia cream, distal half light brown becoming darker at tip; basitarsus with first three fourths cream and distal fourth black; basal half of second tarsal segment light brown, distal half black; rest of tarsus black. Shape of legs and proportions as in Figs. 10, 11 and 12. First and second tarsomeres of fore leg flattened. Calcipala well developed, shorter than wide, not reaching pedisulcus (Fig. 13). Claws strongly curved except on fore leg, with small subbasal tooth (Fig. 14).

Haltere lemon yellow on capitulum and distal part of pedunculus, light brown on basal part. Pedunculus with yellow hairs.

First abdominal tergite brown, brass coloured hairs on basal fringe. Tergite 2 with anterior half brown and posterior half black, faintly pruinose. Tergite 3 black, faintly pruinose. Tergites 4 – 9 shiny black with scattered yellow hairs. Sternites dirty white.

Gonopophyses broadly triangular, glabrous and sclerotised on inner margins (Fig. 15). Eighth sternite with 1 + 1 groups of about 12 setae. Cerci and paraprocts as shown in Fig. 16; paraprocts about one and a half times as long as basal width, highly setose. Genital fork with slender sclerotised stem, anterior processes of posterior arms broadly triangular and sclerotised (Fig. 17). Spermatheca oval with smooth texture, spermathecal



Figs. 1-9 – *S. (C.) dekeyseri* female. 1: head, anterior view; 2: frontoocular triangle; 3: antenna; 4: cibarium; 5: maxillary palp; 6: sensory vesicle of maxillary palp; 7: colour pattern of mesonotum; 8: wing; 9: anterior veins of wing.

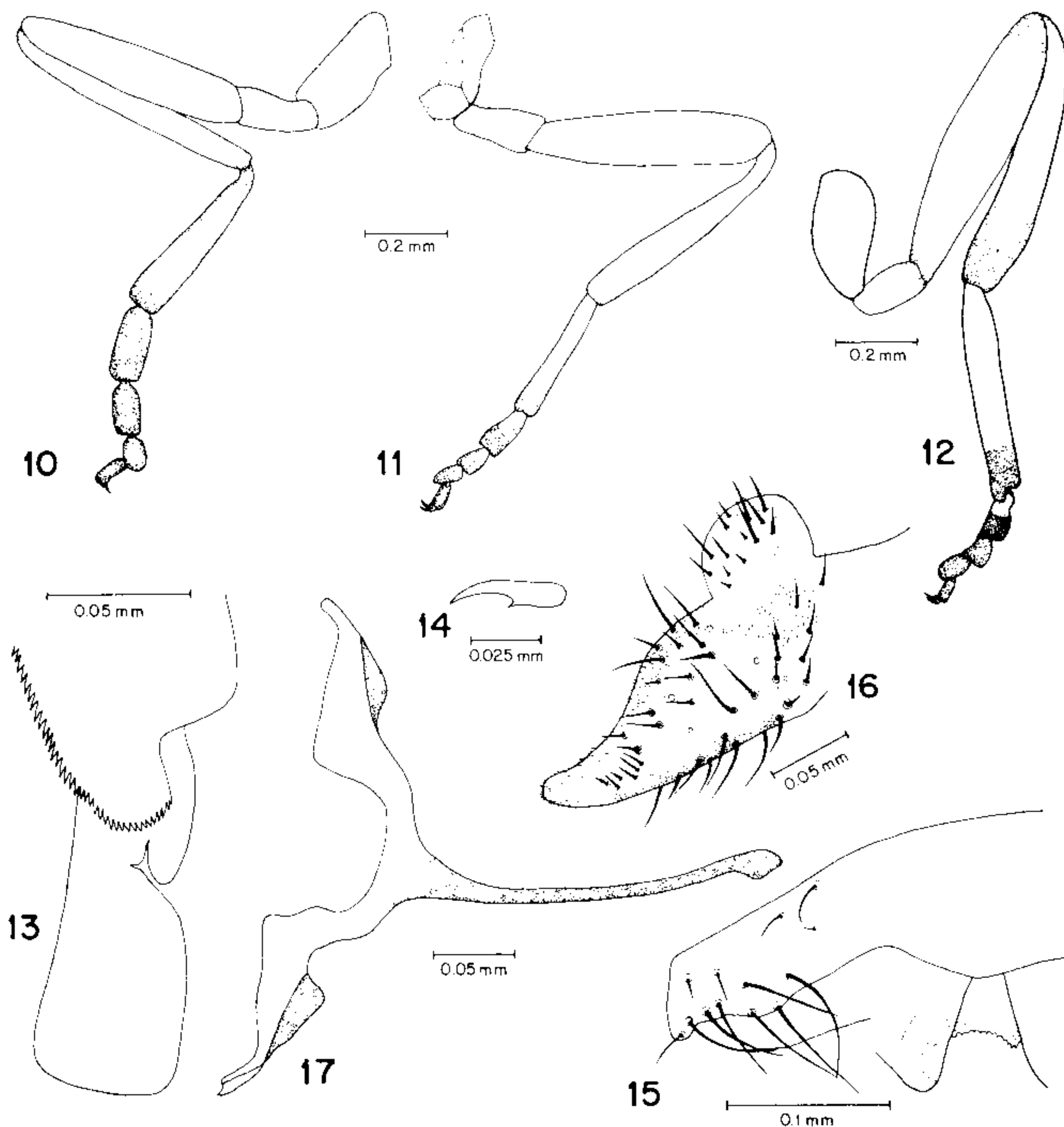
duct and its area of insertion membranous; spicules on inner surface of spermatheca of variable size, grouped in threes in basal half and scattered in distal half.

Male. General body colour black. Length: body 1.8 – 3.4 mm (dried specimens 1.8 – 2.4 mm, alcohol specimens 2.3 – 3.4 mm); wing 2.1 – 2.7 mm.

Eyes red, holoptic. Colouration of head as in female except antennae which are darker.

Antennae slightly shorter and with narrower flagellomeres than female (Fig. 18). Single row of hairs between eyes. Marginal hairs of clypeus longer and denser than in female. Maxillary palp as shown in Fig. 19; sensory vesicle oval, smaller and with fewer tubercles than in female.

Mesonotum as shown in Fig. 20; central area velvet black, faintly pollinose with median pruinose line; 1 + 1 faint pruinose submedian lines, divergent posteriorly, sometimes present. Few adpressed silvery white hairs on black area of mesonotum. Lateral and



Figs. 10-17 - *S. (C.) dekeyseri* female. 10: fore leg; 11: mid leg; 12: hind leg; 13: apex of posterior basitarsus with second tarsal segment; 14: claw of hind leg; 15: part of eighth sternite with gonopophysis; 16: paraproct and cerous; 17: genital fork.

posterior margins of mesonotum silver with dense silvery yellow hairs. Rest of thorax as in female.

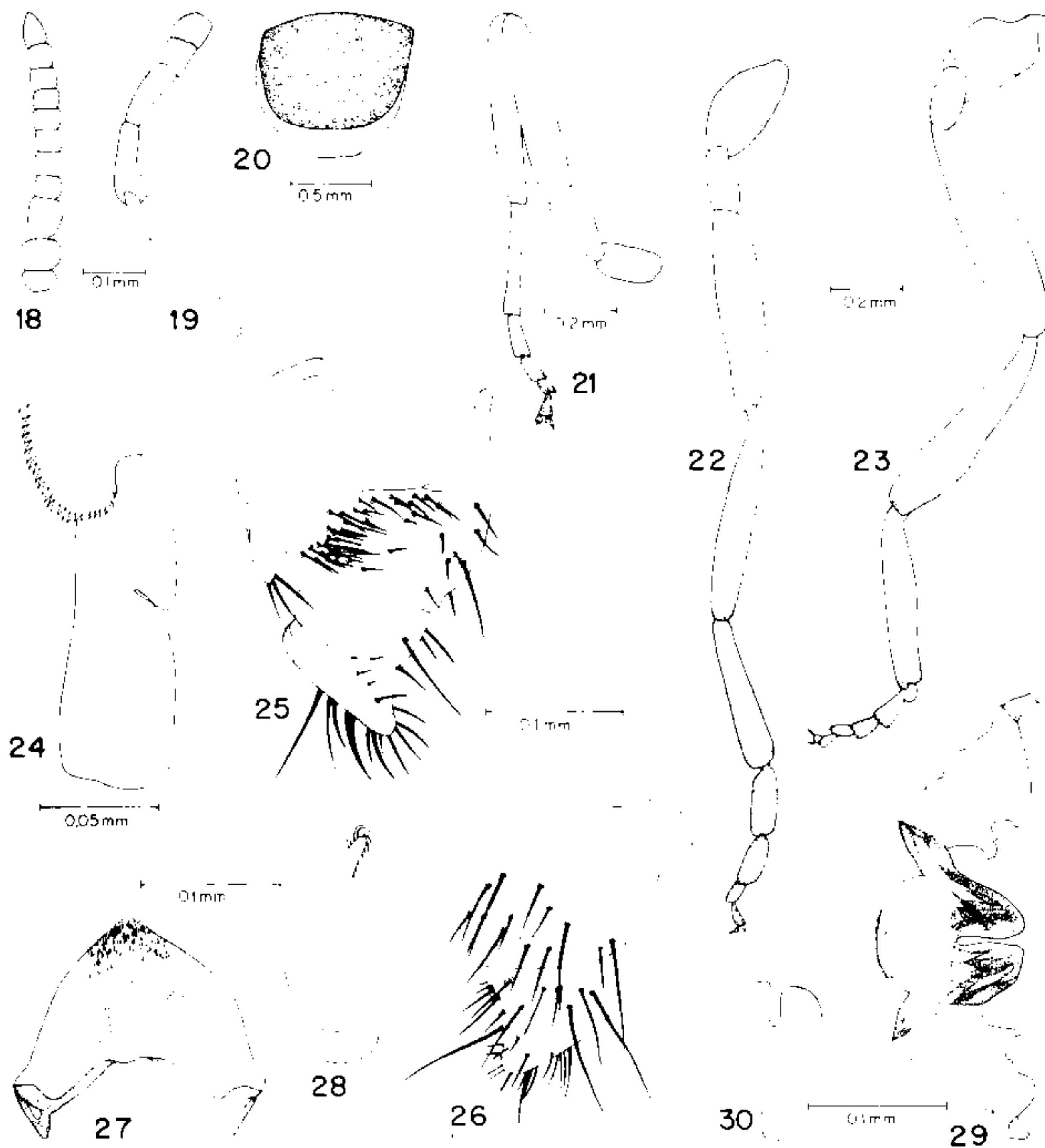
Wings as in female except veins darker brown; So bare or with one basal hairlike macrotrichia, rarely with macrotrichia on median section.

Leg colour as in female except outer surface of tibia of fore leg brown, second tarsal segment of mid leg dark brown and distal half of hind leg tibia brown and second tarsomere of this leg dark brown. Shape and proportions of legs as in Figs. 21, 22 and 23. Calcipala and pedisulcus as shown in Fig. 24.

Capitulum of haltere lemon yellow with orange base, pedunculus brown with distal tip orange; hairs on pedunculus brown.

Abdominal tergites velvet black with scattered brown hairs. Basal fringe with brownish black hairs, denser and longer than in female. 1 + 1 lateral silver pruinose areas on tergites 2, 8 and 9 and posterior margins of tergite 7 silver pruinose.

Paramere brownish black and setose; basimere slightly wider than long, distimere subtriangular and shorter than basimere with no spine (Figs. 25 and 26). Ventral plate narrow, convex dorsally; distal end with broadly pointed apex and short curved setae, main body with numerous spiniform setae mainly concentrated along mid line (Figs. 27 and 28). Endoparameral organ as shown in Fig. 29, median sclerite as in Fig. 30.



Figs. 18-30 - *S. (C.) dekeyseri* male. 18: antenna; 19: maxillary palp; 20: colour pattern of mesonotum; 21: fore leg; 22: mid leg; 23: hind leg; 24: apex of posterior basitarsus with second tarsal segment; 25: paramere, ventral view; 26: paramere, dorsal view; 27: ventral plate, dorsal view; 28: ventral plate, lateral view; 29: endoparameral organ; 30: median sclerite.

Pupa. Length: cocoon, dorsal 2.4 – 3.2mm, ventral 2.8 – 3.8mm; pupa 2.6 – 2.7mm; gill 1.7 – 2.4mm.

Cocoon slipper shaped (Fig. 31), mid to dark brown. Rim of aperture reinforced and darkly pigmented. Surface of cocoon smooth and composed of fine threads; ventrally threads loosely woven and present only on distal half. Slight ventral prolongation anterior to collar at point of attachment in form of loosely woven threads.

Gill dark brown with 8 filaments arranged in a vertical plane (Fig. 32). Main trunk gives rise to three branches: lower with two filaments arising basally, median with three filaments arising basally at different heights from base, upper with one filament arising basally and two others at a short distance distal to this. Filaments slender, tapering distally, with rounded ends and crenated margins, densely covered with small tubercles some of which are more prominent and run spirally around the filaments.

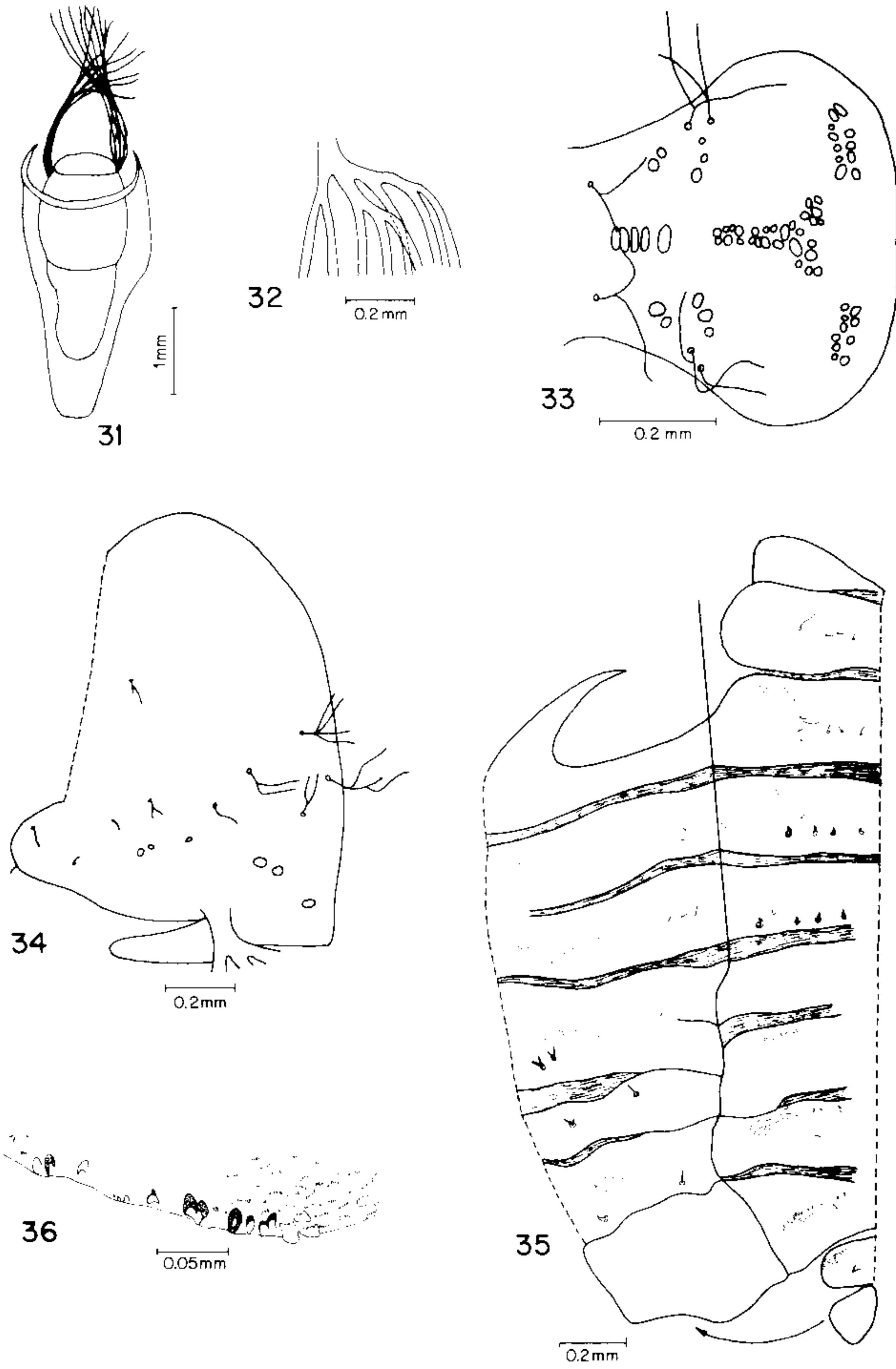
Head and thorax of pupa with numerous tubercles, almost covering the frontoclypeus and anterior margin of thorax except in areas occupied by platelets (Figs. 33 and 34). Head with 2 + 2 frontal and 1 + 1 facial trichomes (Fig. 33) which are from 1 – to 4-branched. Frontoclypeus of female wider and shorter than of male. Thorax with 3 + 3 dorsal trichomes with 3 to 7 branches; 2 + 2 antero-lateral, the anterior with 1 to 3 branches and the posterior unbranched; one antero-ventral with 1 to 2 branches; and one mid-lateral unbranched. Fine spine on antero-ventral margin (Fig. 34).

Abdominal tergites colourless, onychotaxy as shown in Fig. 35. Tergite 1 with 1 + 1 hairlike setae and 1 + 1 groups of spiniform setae; tergite 2 with 4 + 4 spiniform setae, 3 + 3 hairlike setae and 1 + 1 antero-lateral areas of fine spinelike processes; tergite 3 with 4 + 4 hooks, 1 + 1 small spiniform setae anterior to hooks and 1 + 1 antero-lateral areas of fine spinelike processes; tergite 4 with 4 + 4 hooks and a small hairlike seta anterior to the two lateral hooks; tergite 5 without setae; tergites 6 and 7 with 1 + 1 antero-lateral groups of spine combs; tergite 8 with 1 + 1 lateral spiniform setae and 1 + 1 antero-lateral groups of fine spiny processes (Fig. 36); tergite 9 with 1 + 1 antero-lateral groups of fine spiny processes. Apex of abdomen with 1 + 1 blunt sclerotised tubercles. Sternites 3 and 4 with 1 + 1 groups of 3 hairlike setae and an antero-median group of fine spiniform setae; sternites 5 to 7 with 2 + 2 hooks which are bifid and adjacent on sternite 5 and simple and well spaced on sternites 6 and 7, sternite 5 with lateral seta and median area of fine spiny processes, sternite 7 with median area of fine spiny processes, sternites 8 and 9 without setae or processes.

Larva. Length 5.8 – 7.5mm, width of head capsule 0.6 – 0.7mm. Body colour varying between greyish brown and greenish brown with white intersegmental lines. Ventral nerve cord greyish brown. Cuticle glabrous except for 4 + 4 lateral spines on posterior abdominal segments and setae in anal area.

Head yellowish brown, eye spots surrounded by clear area. Head spots brown, pattern as in Fig. 37. Body form as in Figs. 38 and 39. Antenna mid brown with white spots at base of third and fourth segments and in middle of second segment (Fig. 40); proportions of segments about 3 : 4 : 6. Cephalic fan with 38 to 44 rays, usually 38. Hypostomial teeth as in Fig. 41; corner teeth higher than median tooth, intermediate teeth smallest and subequal, 6 – 9 lateral serrations, 4 – 8 setae. Postgenal cleft slightly longer than wide and longer than postgenal bridge (Fig. 42). Mandible as shown in Fig. 43 with one or two subbasal serrations; number of serrations sometimes differs for each mandible of same larva. Maxillary palp 3 times as long as basal width (Fig. 44).

Lateral sclerite of proleg weakly sclerotised with 1 – 4 setae on 8 – 12 tubercles (Fig. 45).



Figs. 31-36 — *S. (C.) dekeyseri* pupa. 31: cocoon and pupa; 32: gill; 33: frontoclypeus; 34: thorax; 35: abdomen; 36: spine combs of eighth tergite.

Posterior arms of anal sclerite almost twice as long as anterior arms (Fig. 46). One row of 8 – 10 setae between posterior cirlet and posterior arms of anal sclerite. 16 + 16 setae lateral to anus and about 12 scattered on anterior fold of anus. Groups of cuticular processes in concentric rings on anterior walls of rectum. Posterior cirlet with 100 – 116 rows of hooks with up to 20 hooks in each row. Anal gills trilobed, each lobe bearing from 24 to 27 fingerlike secondary lobules (Fig. 47).



Figs. 37-47 – *S. (C.) dekeyseri* larva. 37. cephalic apotome; 38. larva, lateral view; 39. larva, dorsal view; 40. antenna; 41. hypostomium; 42. ventral view of head, flattened; 43. mandible; 44. maxillary palp; 45. lateral sclerite of proleg; 46. anal sclerite; 47. anal gills.

MATERIAL EXAMINED

Holotype – pinned female with associated pupal pelt. Córrego Cachoeirinha, Brasília (Federal District), Brazil. A. J. Shelley & V. Py-Daniel, July 24th 1975.

Allotype – pinned male with associated pupal pelt. Data as for holotype.

Paratypes – 105 males and females with associated pupal pelts on pins, preserved in alcohol and mounted on slides; numerous larvae and pupae preserved in alcohol and

mounted on slides. Data as for holotype, collections made on April 25th 1975, July 24th 1975 and March 15th 1976.

The holotype (nº 122A), allotype (nº 122B) and paratypes (nº series 101 – 103, 119 – 127, 156 and 157) are deposited in the Oswaldo Cruz Institute, Rio de Janeiro. Paratypes have also been deposited in the following museums: American Museum of Natural History, New York (nº series 124 – 126, 156); British Museum (Natural History), London (nº series 101, 103, 119 – 127, 156 and 157); Museo de La Plata, Argentina (nº series 156); United States National Museum, Washington (nº series 156, 157).

TAXONOMIC POSITION

S. dekeyseri is anatomically similar in all stages to *S. pertinax* Kollar, 1832 as redescribed by Andretta and Andretta (1950) but has a mesonotal pattern in the female similar to *S. lahillei* Paterson & Shannon, 1927 as figured by Wygodzinsky (1949). The combination of characters given by Stone (1963) for *Chirostilbia* fits sufficiently for *S. dekeyseri* to be placed in this subgenus.

DISTRIBUTION AND BIOLOGY

S. dekeyseri has been collected from the following rivers of the Central Brazilian Plateau: Córrego Cachoeirinha (type locality), 15°45'S, 47°45'W, Brasília (Federal District), elevation 800m, 3 km upstream from confluence with Rio Paranoa; Rio Saia Velha, 16°6'S, 47°57'W, State of Goiás, elevation 1000m, about 4km upstream from old hydroelectric station; Ribeirão São Pedro, 16°45'S, 47°25'W, State of Goiás, elevation 900m, about 10km upstream from Brasília – Belo Horizonte highway (BR 040) at Cristalina.

Larvae and pupae of this species are found in medium to fast flowing waters attached to emergent vegetation. Females do not apparently bite man.

S. dekeyseri has been named after Dr. P. Dekeyser who provided the first specimens for examination.

RESUMO

Os autores descrevem uma nova espécie de *Simulium* (*Chirostilbia*) *dekeyseri* a partir de adultos, larvas e pupas. Esta espécie zoofílica só foi encontrada na região do Cerrado do Planalto Central Brasileiro.

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